

Human-Environmental Relationships in Prehistory: An Introduction to Current Research in South and Southeast Asia



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WHILE THE SIGNIFICANCE of the environment to human cultures has long been accepted by anthropologists (e.g., Vayda 1969), the exact nature of human-environmental relationships remains a contentious issue in anthropology (McGlade 1995; Milton 1993). Over the past 50 years, archaeologists often provided explanations of past cultural change that tended toward environmental determinism (e.g., Sanders and Price 1968). Under these scenarios, a given characteristic of the environment (e.g., increasing aridity) was accompanied by a uniform cultural response (e.g., adoption of agriculture). Interpretations of prehistoric human and environmental relationships offered by proponents of the New Archaeology (e.g., Binford 1968; Flannery 1973) were less deterministic, but nonetheless tended to view such relationships as ultimately adaptational and persistent. By the 1980s, anthropologists and archaeologists began reacting against functionalist and cultural ecological models, suggesting that such models could not account for change, that changes in the environment alone were rarely determinant, and that often cultural responses were not adaptive in the long run (Dunnell 1980; Hill 1977; Hodder 1986; Shanks and Tilley 1987; Tilley 1991).

Most recently, postmodern perspectives in anthropology, geography, and archaeology reintegrate environment, landscapes, and space as part of meaningful interpretations of social context and social change (Bender 1993; McGlade 1995; Soja 1989; Thomas 1993; Tilley 1991). Milton (1993:4) has suggested that "the whole field of cultural anthropology can be characterized as human ecology." One trajectory, reflecting the postmodern sensitivity to political issues, focuses on the interface of environment with environmental movements, development, and indigenous groups (e.g., Kirsch 1996; Milton 1993). As McGlade (1995:113) notes, however, postmodern perspectives often privilege the social, emphasizing relativistic and observer-dependent domains of meaning (e.g., Thomas 1993; Tilley 1991). Such perspectives seem to replace the environmental determinism of earlier research with a social determinism.

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A theoretical orientation that attempts to benefit from these two extreme positions (environmental and social determinism) is advocated here (see also McGlade 1995). The environment is not entirely separate from human populations, nor is it a static or equilibrating phenomenon. Environments and humans are intricately interrelated and codetermined. Change in one affects change in the other; consequently they can be said to coevolve (Rindos 1984). Cultural changes are not always functionally related to the environment, nor are they necessarily adaptive or optimizing in either the short or long run. Unintended consequences of human actions (e.g., deforestation) play a crucial role in changing environmental-human relationships. In studying the environment, then, we are not looking for ultimate causality or linear or equilibrated patterns of adaptive change; rather we are looking for the disjunctures, the discrepancies, the divergences that cultural groups with different strategies and value systems create in local and regional ecologies.

The Indo-Pacific area provides a unique and exciting focal point for studying changing human-environmental relationships. The biological, environmental, cultural, and linguistic complexities of the region continue to provide the backdrop for challenging mainstream interpretations in both social and physical sciences (e.g., Blust 1988; Sauer 1952). In the Pacific portion of this area, archaeologists (Athens and Ward 1992, 1993; Ellison 1994; Kirch 1982; Kirch and Ellison 1994; McGlone et al. 1994; Olson and James 1984; Spriggs 1985) have been exploring a variety of human impacts in island environments for more than a decade. Their studies have altered our views about the nature and timing of human colonization of insular landscapes and the effects that humans have had on the natural biota and the physical landscape during the Holocene. It is encouraging to find a similar research trajectory being pursued in Asia, and we suggest that we are only beginning to tap the archaeological and palaeoenvironmental resources available in this region to reorient our theories of the nature and shape of social and natural change (e.g., Grave 1995; Mudar 1995; White 1995; White and Pigott 1995). The conjunction of such a rich testing ground and increasingly sophisticated theories of human-environmental change will offer rich rewards.

The papers in this volume represent the transitional period through which archaeology is currently wending its way. They raise questions relating to the coevolution of landscape, environment, and society, the problems of nonlinear change, and the complex structure of differently scaled ecological phenomena. Each paper provides a distinct example of the potential of environmental studies for identifying not only how cultural groups articulated with their landscapes in the past, but where variable human-ecological structures can be used to understand the context in which cultural groups have changed. The last decade has witnessed a growing recognition of the need for archaeologists, landscape ecologists, and palaeoenvironmentalists to develop joint research goals, however, as yet, these situations are relatively rare. Such a multidisciplinary approach enables closer scrutiny of the complexity of cultural change.

In compiling these articles, we have included a diverse set of studies on environmental-human relationships in southern and southeastern Asia. These include macrobotanical analyses (Weber), as well as pollen (Penny et al., Maloney), charcoal (Penny et al., Kealhofer), phytolith (Kealhofer, Penny et al.), and geomorphological (Bishop et al., Boyd et al.) studies. Not only are the techniques these authors employ diverse, but the periods of time (from Late Pleistocene to Late

Holocene) and the problems addressed are also disparate. What matters in this diversity is that each study forms a piece of what eventually should be multievidential and multidisciplinary models of regional human-environmental trajectories.

For example, Bishop and his coauthors are interested in understanding the historical relationship between the Yom River and the historic town of Sisatchanalai in central Thailand. The current and past flood regimes of the Yom suggest that the city was frequently flooded and was buried in sediment as a consequence. How did the inhabitants of the town deal with this problem? While the frequency of flooding seems to have decreased during the early occupation of the city, flooding and sedimentation significantly increased well before the locality was abandoned. Clearly, the choice to remain in the city shows a significant disjuncture with what would be a logical response to regular environmental perturbations. The production of commodities for exchange by the inhabitants of the city, and by extension, the larger polity, are identified as part of the strategy to adjust to (or compensate for) recurrent flooding in the region. At what point this strategy was no longer viable, and why, are questions that still need answers.

Weber takes on a much broader problem in examining the transition from the Mature to the Late Harappan periods in the Indus River Valley. The pattern of change in the organization of material culture style and technology appears to differ from the changes that occurred in the organization of food production. Where material cultural styles become regionalized in the Late Harappan period, the components of the subsistence system become increasingly shared over the whole Indus River Valley. This discrepancy in organizational coherence poses a problem: is it an artifact of the way we categorize things archaeologically, or were production systems organized in different ways? In fact, both would appear to be true. Decisions to intensify and broaden the agricultural base were made in a manner different from decisions related to the mass production of goods for exchange. Also, the terminology we use often leads us to equate entities categorized together (i.e., material and agricultural production systems) and then to assume they function in similar ways. In fact, today production systems are rarely similarly scaled or organized, nor were they in the past (e.g., Ehrenreich et al. 1995). As Weber shows, subsistence production in the Late Harappan period was organized very differently from other production systems, suggesting we need to reevaluate our hierarchically integrated interpretations of Harappan society.

Two of the articles focus on the development of rice agriculture in northeastern Thailand. Research in Thailand has been a touchstone for reorienting anthropological understandings of agricultural origins (e.g., Gorman 1972; Sauer 1952; Solheim 1972). Key to many of the arguments about agricultural development is the nature of the resource base, its dependability, its diversity, and its composition. Archaeologists working in the tropics have suggested that these factors map out very differently in the tropics from the way they do in temperate and subtropical regions (Hutterer 1983). Evidence for early manipulation of environmental and plant resources in the tropics is increasing (e.g., Golson 1989; Groube 1989; Piperno et al. 1991a, 1991b). In mainland southeast Asia, however, the chronology and mechanisms for the development of agricultural strategies have been questioned, leading some archaeologists to suggest the possibility that agriculture developed only in the last 4000 to 5000 years in Thailand.

While stimulating new directions in research, these ideas have only recently

been followed up with more detailed investigations of agricultural development in the tropics. Penny, his coauthors, and Kealhofer investigate the evidence for the advent of agriculture in northeastern Thailand. Data from these studies derive from independent sediment sequences of different ages. We demonstrate that human environmental relationships in this region reflect a high degree of complexity, nonlinearity, and cyclical variability. While "the development of agriculture" is the rubric under which these data are discussed, both articles reveal that seeking "origins" may not be the most productive way to conceptualize research on this topic. The sediment records for this area reveal environmental discontinuities created by both human and climatic change, not linear evolution of agricultural systems. The variable intensity and patterning of human actions in the landscape, evident from the Late Pleistocene, require more sophisticated modeling of system structure and change, as well as the variety of human forms for plant use and landscape modification.

Boyd et al. offer an example of the archaeological value of geomorphological reconstructions of the human landscape. Potential site locations are identified based on reconstructed resource distributions during different phases in which land forms appeared during the Holocene. While less attention is paid to the evidence for human impact in these landscapes, Boyd et al. emphasize the role of resource diversity and landscape distribution in structuring human food production and settlement in this coastal region of Thailand.

Maloney's article provides another case study involving the analysis of pollen from several different sites in northern Sumatra. The pollen diagrams extend back to the early Holocene and show several different periods in which arboreal pollen decreased substantially and different components of the nonarboreal vegetation increased. These changes may be due, in part, to human activities, including the effects of burning forests for improved hunting access and the burning of forests for agricultural production. The best evidence, of course, is from the more recent periods of forest clearance, and approximately 2600 years ago some form of rice cultivation most likely began in this area. Maloney hypothesizes that an earlier phase of root cultivation may have preceded rice in northern Sumatra, but it is still unclear whether dry-land rice preceded wet-rice cultivation in this humid area of the tropics.

It is crucial to recognize the complex interactions of time, geographic scale, the level of environmental data, and our inferences regarding past human and environmental relations, as represented in these papers. Despite pioneering efforts to systematically collect data sets relating to the prehistoric environment of Asia, we are currently data-deficient when it comes to developing inductive and realistic models of variable and changing human-environment relationships. Neither a single model nor a single pattern is presented here, but rather, as we might expect given the long history and the diverse environments and peoples of Asia, there is a mosaic of patterns that shift in their characteristics over time and space. These articles are a first step toward a broader-based, environmentally informed understanding of past human societies in Asia, their contexts, and how they changed over time. They contribute to a rapidly growing body of diverse environmental studies (e.g., Ingold 1993; Van der Leeuw and McGlade 1995; Pollard 1992; Stafford 1995) that should stimulate further interest in developing more

sophisticated methodologies, analyses, models, and interpretations of human-environmental relationships throughout Asia.

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ABSTRACT

Understanding human environmental relationships is fundamental to understanding past cultures. Views of how environments and humans interrelate, however, have changed substantially during the twentieth century. Either the environment or social relations have been seen as causal in changing cultural groups. As McGlade (1995) and others have suggested, differentiating environments and social relations negates their co-dependence and co-evolution. This article briefly introduces the papers presented in this volume, contextualizing them within both the status of current data collection and the theoretical orientation discussed. The pioneering environmental data presented by the authors represent critical first steps in creating models that better reflect the complexity of human environmental relationships in the Asian tropics. **KEYWORDS:** Asian palaeoenvironment, palynology, phytoliths, geomorphology, development of agriculture, agricultural change.